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In the Claims

Claims remaining in the application are as follows:

1. (Currently Amended): A database system ~~capable of executing~~ adapted to execute a database application that transfers a logical object in multiple fragments, the database system comprising:
 - a main storage site;
 - a remote storage site ~~capable of linking~~ adapted to link to the main storage site and ~~mirroring to receive and store mirror~~ information stored in the main storage site, the remote storage site including a storage and a cache sidefile divided into a plurality of array sidefile recordsets;
 - a main protocol executable on the main storage site and ~~capable of including~~ adapted to transfer the logical object in multiple fragments in combination with information indicative of logical object fragment commencement and completion in the multiple fragment database application transfer; and
 - a remote protocol executable on the remote storage site and ~~capable of controlling~~ adapted to control the cache sidefile to cache the multiple fragments as received and to ~~enable destaging of~~ destage the logical object to the storage on receipt of all fragments.
2. (Currently Amended): The database system according to Claim 1 wherein: the main protocol includes information indicative of logical object fragment commencement and completion using a technique selected from among a group ~~including consisting of:~~ (1) explicitly identifying starting and ending fragments sending a start control message preceding the multiple fragments and an end control message concluding the multiple fragments, and (2) ~~implicitly indicating either of the starting fragment and the ending fragment~~ determining either a start control message or an end control message.
3. (Original): The database system according to Claim 1 wherein the main protocol further comprises:
 - an address translation process that translates a logical address to a list of physical addresses.

4. (Original): The database system according to Claim 1 wherein the main protocol further comprises:

an address translation process that resolves a virtual write address of the database application into a pick list of actual physical media writes associated with the logical object.

5. (Currently Amended): The database system according to Claim 1 wherein the main protocol further comprises:

a process ~~capable of creating~~ adapted to create a control message for communication to the remote protocol that instructs individual physical storage elements to operate on the multiple physical writes as a single object entity so that all or none is destaged to the storage.

6. (Currently Amended): The database system according to Claim 1 wherein the main protocol further comprises:

a process ~~capable of receiving~~ adapted to receive an application request to write the logical object of a specified length to a specified virtualized storage address;
a process ~~capable of converting~~ adapted to convert the virtualized write address and resolving the transfer length to designate at least one physical address in at least one physical storage device for transferring the logical object in fragments;
a process ~~capable of sending~~ adapted to send a first control message to the at least one physical storage device that delineates the start of a logical object that is to be held in a remote mirror cache for destaging; and
a process ~~capable of sending~~ adapted to send a second control message that delineates the end of the logical object so that the mirror cache is destaged to the at least one physical storage device, no portion of the logical object fragments being otherwise destaged.

7. (Original): The database system according to Claim 1 wherein:
information is replicated from the main storage site to the remote storage site using a technique selected from among a group including: (1) synchronous data replication and (2) asynchronous data replication.

8. (Original): The database system according to Claim 1 wherein:
the logical object multiple fragments are controllably destaged in all-or-none fashion
to all devices in a consistency group.

9. (Currently Amended): An article of manufacture comprising:
a controller usable medium having a computable readable program code embodied
therein for executing in a database system that runs a database application for
mirroring a logical object in multiple fragments from a main storage site to a
remote storage site, the computable readable program code further
comprising:

a code ~~capable of causing~~ configured to cause the controller to interface with
the database application that links and mirrors data between the main
storage site and the remote storage site, the remote storage site
including a storage and a cache sidefile divided into a plurality of
array sidefile recordsets; and

a code ~~capable of causing~~ configured to cause the controller to create and
deploy the logical object in multiple fragments in combination with
control information indicative of logical object fragment
commencement and completion in the multiple fragment database
application transfer; the control information controlling the cache
sidefile to cache the multiple fragments as received and to ~~enable~~
~~destaging of~~ destage the logical object to the storage on receipt of all
fragments.

10. (Currently Amended): The article of manufacture according to Claim 9
wherein the computable readable program code further comprises:

a code ~~capable of creating~~ adapted to create control information indicative of logical
object fragment commencement and completion using a technique selected
from among a group ~~including~~ consisting of: (1) ~~explicitly identifying starting~~
~~and ending fragments~~ sending a start control message preceding the multiple
fragments and an end control message concluding the multiple fragments,
and (2) ~~implicitly indicating either of the starting fragment and the ending~~
~~fragment~~ determining either a start control message or an end control
message.

11. (Currently Amended): The article of manufacture according to Claim 9 wherein the computable readable program code further comprises:
a code ~~capable of translating~~ adapted to translate a logical address to a list of physical addresses.

12. (Currently Amended): The article of manufacture according to Claim 9 wherein the computable readable program code further comprises:
a code ~~capable of resolving~~ adapted to resolve a virtual write address of the database application into a pick list of actual physical media writes associated with the logical object.

13. (Currently Amended): The article of manufacture according to Claim 9 wherein the computable readable program code further comprises:
a code ~~capable of creating~~ adapted to create a control message for communication to the remote protocol that instructs individual physical storage elements to operate on the multiple physical writes as a single object entity so that all or none is destaged to the storage.

14. (Currently Amended): The article of manufacture according to Claim 9 wherein the computable readable program code further comprises:
a code ~~capable of receiving~~ adapted to receive an application request to write the logical object of a specified length to a specified virtualized storage address;
a code ~~capable of converting~~ adapted to convert the virtualized write address and resolving the transfer length to designate at least one physical address in at least one physical storage device for transferring the logical object in fragments;
a code ~~capable of sending~~ adapted to send a first control message to the at least one physical storage device that delineates the start of a logical object that is to be held in a remote mirror cache for destaging; and
a code ~~capable of sending~~ adapted to send a second control message that delineates the end of the logical object so that the mirror cache is destaged to the at least one physical storage device, no portion of the logical object fragments being otherwise destaged.

15. (Currently Amended): The article of manufacture according to Claim 9 wherein the computable readable program code further comprises:

a code ~~capable of replicating~~ adapted to replicate information from the main storage site to the remote storage site using a technique selected from among a group including: (1) synchronous data replication and (2) asynchronous data replication.

16. (Currently Amended): The article of manufacture according to Claim 9 wherein the computable readable program code further comprises:

a code ~~capable of~~ adapted to controllably ~~destaging~~ destage the logical object multiple fragments in all-or-none fashion to all devices in a consistency group.

17. (Currently Amended): An article of manufacture comprising:

a controller usable medium having a computable readable program code embodied therein for executing in a database system that runs a database application for mirroring a logical object in multiple fragments from a main storage site to a remote storage site, the computable readable program code further comprising:

a code ~~capable of causing~~ executable at the remote storage site configured to cause the controller to receive the logical object in multiple fragment transfers in combination with control information indicative of logical object fragment commencement and completion;

a code ~~capable of causing~~ executable at the remote storage site configured to cause the controller to control storage of the logical object multiple fragments in a cache sidefile divided into a plurality of array sidefile recordsets; and

a code ~~capable of causing~~ executable at the remote storage site configured to cause the controller to cache the multiple fragments as received and to ~~enable destaging of~~ destage the logical object to the storage on receipt of all fragments.

18. (Currently Amended): The article of manufacture according to Claim 17 wherein the computable readable program code further comprises:

a code ~~capable of determining~~ adapted to determine logical object fragment commencement and completion using a technique selected from among a group ~~including~~ consisting of: (1) receiving explicitly identified starting and ending fragments, and (2) deriving either of the starting fragment and the ending fragment implicitly from received control information.

19. (Currently Amended): The article of manufacture according to Claim 17 wherein the computable readable program code further comprises:

a code ~~capable of causing~~ configured to cause the controller to track order of fragment updating between the main storage site and the remote storage site including updating of the sidefile recordsets.

20. (Currently Amended): The article of manufacture according to Claim 17 wherein the computable readable program code further comprises:

a code ~~capable of replicating~~ adapted to replicate information from the main storage site to the remote storage site using a technique selected from among a group including: (1) synchronous data replication and (2) asynchronous data replication.

21. (Currently Amended): The article of manufacture according to Claim 17 wherein the computable readable program code further comprises:

a code ~~capable of~~ adapted to controllably ~~destaging~~ destage the logical object multiple fragments in all-or-none fashion to all devices in a consistency group.

22. (Currently Amended): A storage element readable by a controller tangibly embodying a program of instructions executable by the controller to perform method acts for executing in a database system that runs a database application for mirroring a logical object in multiple fragments from a main storage site to a remote storage site, the method acts comprising:

receiving the logical object at the remote storage site in multiple fragment transfers in combination with control information indicative of logical object fragment commencement and completion;
controlling storage of the logical object multiple fragments at the remote storage site in a cache sidefile divided into a plurality of array sidefile recordsets; ~~and~~
caching the multiple fragments at the remote storage site as received; and
~~to enable destaging of the logical object at the remote storage site to the~~ storage on receipt of all fragments.

23. (Currently Amended): The storage element according to Claim 22 wherein the method acts further comprise:

creating control information indicative of logical object fragment commencement and completion using a technique selected from among a group ~~including~~ consisting of: (1) explicitly identifying starting and ending fragments, and (2) implicitly indicating either of the starting fragment and the ending fragment.

24. (Original): The storage element according to Claim 22 wherein the method acts further comprise:

resolving a virtual write address of the database application into a pick list of actual physical media writes associated with the logical object.

25. (Original): The storage element according to Claim 22 wherein the method acts further comprise:

creating a control message for communication to the remote protocol that instructs individual physical storage elements to operate on the multiple physical writes as a single object entity so that all or none is destaged to the storage.

26. (Original): The storage element according to Claim 22 wherein the method acts further comprise:

receiving an application request to write the logical object of a specified length to a specified virtualized storage address;

converting the virtualized write address and resolving the transfer length to designate at least one physical address in at least one physical storage device for transferring the logical object in fragments;
sending a first control message to the at least one physical storage device that delineates the start of a logical object that is to be held in a remote mirror cache for destaging; and
sending a second control message that delineates the end of the logical object so that the mirror cache is destaged to the at least one physical storage device, no portion of the logical object fragments being otherwise destaged.

27. (Original): The storage element according to Claim 22 wherein the method acts further comprise:

replicating information from the main storage site to the remote storage site using a technique selected from among a group including: (1) synchronous data replication and (2) asynchronous data replication.

28. (Currently Amended): A storage element readable by a controller tangibly embodying a program of instructions executable by the controller to perform method acts for executing in a database system that runs a database application for mirroring a logical object in multiple fragments from a main storage site to a remote storage site, the method acts comprising:

interfacing with the database application that links and mirrors data between the main storage site and the remote storage site, the remote storage site including a storage and a cache sidefile divided into a plurality of array sidefile recordsets; and

~~creating and deploying from the main storage site the logical object in multiple~~
fragments in combination with control information indicative of logical object fragment commencement and completion in the multiple fragment database application transfer; the control information controlling the cache sidefile to cache the multiple fragments as received; and
~~to enable destaging of at the remote storage site the logical object to the storage on~~
receipt of all fragments.

29. (Original): The storage element according to Claim 28 wherein the method acts further comprise:

determining logical object fragment commencement and completion using a technique selected from among a group including: (1) receiving explicitly identified starting and ending fragments, and (2) deriving either of the starting fragment and the ending fragment implicitly from received control information.

30. (Original): The storage element according to Claim 28 wherein the method acts further comprise:

tracking order of fragment updating between the main storage site and the remote storage site including updating of the sidefile recordsets.

31. (Original): The storage element according to Claim 28 wherein the method acts further comprise:

replicating information from the main storage site to the remote storage site using a technique selected from among a group including: (1) synchronous data replication and (2) asynchronous data replication.

32. (Original): The storage element according to Claim 28 wherein the method acts further comprise:

controllably destaging the logical object multiple fragments in all-or-none fashion to all devices in a consistency group.